



February 3, 2016

VIA ELECTRONIC MAIL

Jennifer Renecker
Records Coordinator
Mason County PUD No. 3
PO Box 2148
Shelton, WA 98584

Re: *Public Records Requests Seeking National Rural Telecommunications Cooperative
Response to Mason PUD No. 3 RFP No. 1-2015*

Dear Ms. Renecker:

I am writing on behalf of the National Rural Telecommunications Cooperative ("NRTC") in response to two notifications NRTC has received from Mason PUD No. 3 concerning requests Mason PUD No. 3 has received seeking information under the Washington Public Records Act, RCW Chap. 42.56. The requests seek a copy of NRTC's response to Mason's RFP No. 1-2015 (the "NRTC Response"). The requests are from:

1. Eaton Corporation, dated January 21, 2016. Response requested by February 5, 2016.
2. Tantalus, dated January 28, 2016. Response requested by February 12, 2016.

In each case, the requester has agreed to accept a redacted version of the NRTC Response. Accordingly, in order to resolve these requests, I have attached a redacted version of the NRTC Response. You are authorized to provide this redacted NRTC Response to each of the above-referenced requesters. Please be advised that NRTC considers the redacted information to be privileged and confidential, and protected from public disclosure under the Public Records Act. Accordingly, if you receive a request from any of the above-referenced requesters for any of the redacted information, or a request from any other party for the NRTC Response, please notify us as soon as possible so that we can take appropriate steps to protect the confidential information.

Finally, we are aware of a third request for the NRTC Response from Landis+Gyr. NRTC and Landis+Gyr agreed to an extension to February 24, 2016, to address that request. NRTC is currently addressing that request directly with Landis+Gyr.

Jennifer Renecker
February 3, 2016
Page 2

Please notify me if you have any questions about these matters.

Sincerely,

A handwritten signature in black ink, appearing to read 'Eric Christensen', with a long horizontal flourish extending to the right.

Eric Christensen
Attorney for National Rural Telecommunications
Association

Cc: Robert Johnson
Attorney for Mason PUD No. 3

Enclosure
ELC/aea

CONFIDENTIAL

Response to Request for Proposal

Presented to:

Mason County PUD 3

For:

Advanced Metering Infrastructure (AMI)

Prepared by:

National Rural Telecommunications Cooperative

January 28, 2015



Chad Dose
AMI Sales Engineer
4925 Impatiens Avenue North
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*NRTC Response to
Mason County PUD 3- AMI RFP – Executive Summary*

EXECUTIVE SUMMARY

We appreciate the opportunity for NRTC and Sensus to create a lasting relationship with Mason County PUD 3. As Mason County PUD 3 reviews the following RFP response, we are confident you will be pleased with our proposed solution. We look forward to receiving your feedback and any questions you might have about our response. What follows are the highlights of our solution.

Sensus and NRTC share Mason County PUD 3's dedication to customer excellence, value and fostering an excellent working environment. We are uniquely prepared to partner with Mason County PUD 3 to help you meet your customer service goals and requirements. We ensure that our solution and implementation approach fully maintains service continuity for all users and optimizes transition to AMI timelines while minimizing operational and service risks.

Sensus Overview

Sensus' proposed AMI solution targets and delivers realistic cost savings that result from new technologies that deliver value added business benefits to its customers. We believe our solution and approach will provide Mason County PUD 3 with an optimal platform for AMI networking technology and services.



Sensus USA Inc. is one of the largest meter manufacturers in the world with a rich heritage dating back more than 125 years. The company employs almost 4,000 exceptional, dedicated people and operates on 6 continents. Sensus annual revenue 2013 approached 1 Billion dollars.

Sensus provides electricity, gas and water meters as well as advanced metering infrastructure (AMI) infrastructure and software solutions for multiple utility markets. We have an installed base of over 10,000,000 FlexNet SmartPoints operating in the field. Sensus is considered an innovator in smart



NRTC Response to

Mason County PUD 3- AMI RFP – Executive Summary

metering technology with highly progressive products such as the iConA electricity meter platform designed for AMI applications. Sensus has received commitments for its mature FlexNet two-way licensed band radio frequency (RF) system totaling over 16 Million AMI technology endpoints in 300+ FlexNet deployments.

NRTC Overview

The National Rural Telecommunications Cooperative (NRTC) represents the advanced telecommunications and information technology interests of 1,500 rural utilities and affiliates in 48 states. We help rural electric and telephone utilities strengthen their businesses with solutions uniquely suited to the needs of rural consumers.

Over the past 10 years, NRTC has deployed over 150 AMR/AMI systems within our electric cooperative community.

NRTC was founded in 1986 by electric cooperatives, the National Rural Electric Cooperative Association (NRECA) and the National Rural Utilities Cooperative Finance Corporation (CFC).

NRTC is driven by our members' commitment to provide their communities with innovative telecommunications solutions and a vision for continued viability. NRTC helps ensure our members' success by aggregating their individual buying power, negotiating national contracts, and supporting business solutions which expand their service offerings. NRTC remains focused on bringing advanced telecommunications solutions to rural America.

In this AMI project for Mason County PUD 3, NRTC provides the following benefits:

1. Advantageous pricing based on our aggregation strength
2. A no-cost, three-year warranty on single-phase meters
3. The opportunity for Mason County PUD 3 to earn capital credits on the purchase of the system

Proposal Overview

The Sensus FlexNet system will consist of the FlexWare head-end (RNI) which can reside at Mason County PUD 3's office and will interface with the CIS and other Multispeak compliant software packages. The RNI will communicate with FlexNet base stations via available IP backhaul networks. The locations of the basestations have been determined through a propagation study which utilizes Mason County PUD 3's tower assets as well as a number of third-party and potential tower sites. NRTC and Sensus ask Mason County PUD 3's assistance in identifying the best possible potential tower sites to meet the coverage goals.

The smart meters communicate their data, including load profile interval data for all meters, and alarms directly to the basestations. It is then transmitted over the backhaul network to the RNI. If a meter cannot communicate directly to a basestation, it will use [REDACTED]



NRTC Response to

Mason County PUD 3- AMI RFP – Executive Summary

The same FlexNet network that is used for metering can also be used for other applications such as distribution automation, demand response and home area networking.

Licensed Spectrum Yields Performance, Reliability and Risk Mitigation

FlexNet is the only AMI system on the market today that operates on primary-use spectrum that is licensed and protected by the Federal Communications Commission (FCC). This licensed spectrum guarantees MASON COUNTY PUD 3 will have a legally protected right-of-way to its critical customer data, AMI load management systems and AMI distribution automation systems for more than 20 years. Other systems operating on unlicensed spectrum have no protection against interference from other systems operating in the same band. This interference degrades the operation of the system over time and can completely jam areas of system operation. Other AMI vendors have publicly sought relief from the FCC when jamming occurs, but have received none.

“Unfortunately, many highly critical utility control networks currently operate on radio frequency bands that must be considered suspect. Far too many have only secondary (interference-accepting, non-interference causing) status on the 150-512 MHz bands allocated primarily for mobile voice systems. Many more operate on unlicensed spectrum, mostly in the 900 MHz band, sharing it with hundreds of millions of other devices, from cordless phones to wireless Internet service providers and RFID tags. These are not the best environments for such mission-critical networks.”

—*The Utility Spectrum Crisis: A Critical Need to Enable Smart Grids*, Utilities Telecom Council, January 2009

State-of-the-Art Smart Meters

Communication vendors and metrology engineers nationwide consistently find that the advanced family of Sensus meters provides complete functionality, superior reliability, flexible integration capability, industry standards compatibility and economical value. The rich feature set of Sensus iCon meters includes remote disconnect/reconnect capability, Time-of-Use (TOU), Dynamic Pricing (DP), Critical Peak Pricing (CPP), Demand Response (DR), net metering, remote demand reset, advanced power factors, advanced displays, multi-channel interval data, two-way communications, advanced calendar and clock features, tamper detection, power outage and restore detection, theft detection, remote firmware upgrades, current limiting features and more. These features position the Sensus family of smart meters as the ideal endpoints for your demanding applications. Sensus has a rich heritage of quality and reliability and backs the iCon product families with attractive pricing and warranties. Delivering an open system, Sensus has and will continue to incorporate other residential and commercial metering products like the, Landis + Gyr Focus, GE KV2c and Elster A3 meters.



A Single Technology Solution

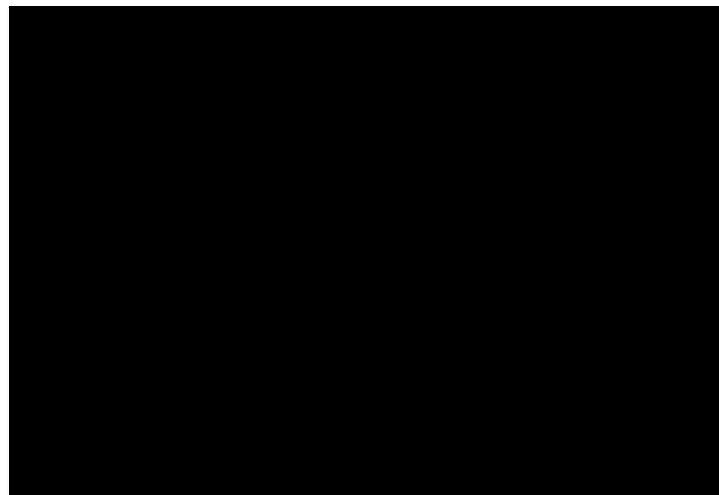
FlexNet is an established, fixed-base solution for dense urban to sparse rural electricity, gas, and water meter densities in any terrain. It is field proven in the dense urban/suburban Birmingham, Alabama network and in the mountainous terrains of Hawaii, northern Georgia, and British Columbia. FlexNet was designed from the outset for any combination of electricity, gas, and water applications.

FlexNet solutions have been designed to adapt to conservation requirements, regulatory and security demands. Sensus understands that meter reads, customer data, and telemetry data are highly sensitive. We have extended every effort to ensure the protection and integrity of AMI infrastructure and customer data. As the utility industry's security and regulatory standards evolve, FlexNet is ahead of the curve with a comprehensive and holistic security design—one that will easily adapt to evolving security standards. The bottom line—the FlexNet AMI solution has been designed to operate in any environment and is able to adapt to meet the complex and dynamic requirements of the energy industry such as energy management, rate development, power quality analysis, customer relationship management and revenue protection.

Ease of Open-Systems IT Systems Integration

The Sensus solution implements the latest industry standards and compatibility for IT integration with its industry-leading FlexWare head end system. Sensus is committed to [REDACTED] as the integration tool of choice, which provides for straightforward integration with a range of new and/or existing utility applications including [REDACTED]. For example, Sensus has developed MultiSpeak interfaces [REDACTED]

[REDACTED]





AMI Integration of Demand Response

Sensus has partnered with OATI, of Minneapolis, and EnTek to provide a comprehensive load control package.

OATI webDistribute is the OATI patented comprehensive tool to monitor, control, schedule, and manage of Demand Response (DR) and Distributed Energy Resources (DER). It provides two-way visibility between retail/demand-side resources, wholesale energy markets, and all the intermediate levels of the business hierarchy – an ideal solution for integrated Smart Grid operations.

EnTek provides two-way load control switches which operate on the same FlexNet network as the AMI system, and utilize the full 2 Watt FlexNet transceiver. The switches contain multiple, individually addressable, relays for controlling Air Conditioners and Water Heaters.

Sensus DA (Telemetric)

In July 2009, Sensus acquired the assets and business of Telemetric Corporation. With over ten years of experience in distribution automation technology, Telemetric has an established track record of providing utilities with intelligent, innovative, reliable and secure end-to-end solutions for distribution automation systems. Telemetric, who offers a complete line of intelligent communication solutions specific to electric distribution system monitoring and control, is developing a portfolio of solutions for the gas distribution automation arena.

Coupled with Sensus' activities in distribution automation and home automation, this acquisition gives Sensus a significant and established presence in the distribution automation portion of the utility landscape. Through the integration of Sensus' industry leading FlexNet smart grid communication technology, Telemetric extends Sensus' reach and solutions to all parts of the Smart Gas Grid.

FlexNet Provides a Future-Proof Technology Solution.

FlexNet offers the flexibility utilities need to meet the operational demands of the future with FCC-protected spectrum and redundancy at every level to downloadable endpoint code and software-based radios. FlexNet Basestations and endpoints are software defined radios. Modulation, baud rate and protocols can be enhanced or changed as needed. Sensus recently released improved software for the iConA meter [REDACTED]. In addition, all FlexNet endpoints can transmit on up to [REDACTED]

[REDACTED]
[REDACTED]
[REDACTED] give FlexNet the functionality and adaptability utilities need to meet the business challenges they face in uncertain energy markets.

Project Team



Mason County PUD 3 Project Team Resumes

Primary Project Manager: [REDACTED], NRTC

Industry Experience: 25+ years

Education: Bachelor of Science, Electrical Engineering Technology, University of New Hampshire
Performance Management Courses – Duke University

Professional Background: [REDACTED] has 25+ year's product development experience with 10 years in the power utility as senior level project and development management experience, and seven (7) years product management experience. Larry is a proven leader with accomplishments in Smart Grid product development, Customer relationship management, Project Management and Process Improvement.

Sensus Project Manager: To Be Determined

IT Project Manager: [REDACTED], Sensus

Industry Experience: 10+ years

Education: BS Telecommunications Mgmt – DeVry Technical Institute
PMP – Project Management Institute
Green Belt – Six Sigma

Professional Background: With over 10 years of AMI experience in an operations environment, [REDACTED] experience includes process improvement, data delivery, change management, root cause analysis, system administration, interface development, customer integration, as well as interacting with internal and external customers.

Primary Field Engineer: [REDACTED], NRTC

Industry Experience: 30+ years

Education: ASEE RETS Electronic Institute
AAS Pikeville College
Attended University of Kentucky

Professional Background: Over 30 years of experience in the communications industry including operations management, technical management, system design, integration, and management. Large scale project management and system build out which included working with union labor requirements for rooftop installations in NYC and Chicago. Management of tower operations including in access of 100 owned communications sites and over 200 leased facilities. New product development including hardware and software development, production, and marketing. Direct sales to private industry as well as local, state, and federal government agencies.



*NRTC Response to
Mason County PUD 3- AMI RFP – Executive Summary*

Additional Field Engineers: To Be Determined

Sensus Partners with its Customers to Enable the Smart Grid

Smart grid technology is transforming the relationship between utilities and consumers as information creates awareness and a better understanding of water and energy usage and opportunities for conservation. This understanding gives consumers the tools they need to make educated decisions on their energy use, which can lower bills and reduce impact on the environment.

Sensus is a vital partner in this effort, because they provide innovative smart grid solutions that help utilities around the world conserve water and energy. They've been successful by consistently providing the latest and best technologies to their customers, including smart grid systems that enable two-way communication between electric, gas and water utilities and their own customers.

A primary driver of Sensus innovation is the delivery of the FlexNet communications network, which combines with Sensus electricity smart meters and Distribution Automation devices to provide utilities with a complete smart grid solution.

Thank you in advance for your thoughtful consideration of our proposal. We look forward to embarking on a great partnership with Mason County PUD 3.

Respectfully,



NRTC

Sensus USA Inc.

Section 3. System Requirements

The District desires a proven two-way RF Mesh fixed multi-purpose energy management communications network solution, which offers remote monitoring and control functions to various devices on the proposed PUD 3 system.

DO NOT COMPLY – Sensus FlexNet is a point to multipoint solution.

The bidder must guarantee the Federal Communications Commission (FCC) radio frequencies and radio network utilized with bidder's product will be available to Mason County PUD No. 3 for use in its AMI system for a minimum of fifteen (15) years. If the frequencies or radio network utilized by the bidder is no longer available or functional for use in the AMI system for any reason during the fifteen (15) year warranty period, bidder shall modify, repair or replace the system with an equivalent functioning system at bidder's sole and exclusive expense.



The AMI solution shall address and support the following energy related features and functions identified in this section (3. System Requirements).

3.1 System Overview

The District desires to own, operate and maintain its own network. The network should have battery back-up. The installation design of collectors should maximize RF mesh coverage using PUD 3's existing and proposed Ethernet backhaul fiber network. PUD 3 will use the network for both AMI and future DA, and it must be capable of routing DA message packets with or without any AMI meters installed.

With this information in mind, please provide a description and block diagram of bidder's proposed solution. Describe any single points of failure, for example:

- Endpoints.

Communicate directly to a tower, each endpoint is to see [REDACTED] in a propagation study for redundancy.

- Routers.

- Collectors.

BASESTATIONS – have redundancy overlap

- Communications. TCP/IP backhaul from tower to basestation

- Server(s).

Hosted solution has 2 site redundancy

3.2 General Requirements

- A two-way, fixed RF Mesh network communications system utilizing Frequency Hopping Spread Spectrum (FHSS) radio technology providing a guarantee of one hundred percent (100%) coverage of the PUD 3 service area.

DO NOT COMPLY this is a point to multipoint RF technology not MESH

☐ Network components must communicate via 902-928 MHz unlicensed radio frequency or a licensed frequency.

901 to 940 licensed spectrum

☐ RF Mesh infrastructure shall provide optimum performance and timing with self-healing characteristics to ensure reliable data delivery.

Not Mesh

☐ Daily retrieval of all electric meter data with at least 99.9% of all meters successfully read each day without estimation.

Communicating meters have been designated in prop study. Must develop a plan with MCPUD3 to cover remaining.

☐ All data retrieved shall be time-stamped by the endpoint.

COMPLY

☐ The host system must transmit all necessary billing data, without estimates, for at least 99.9% of the meters in each billing cycle to the customer information system on a daily basis within twenty-four (24) hours of the end of the billing cycle.

[REDACTED]

☐ All alarms, including power failure, shall be programmable by event type and be reported via an unsolicited event message.

[REDACTED]

☐ The communications system shall support real-time, on-demand meter reading requests and shall have an average response time of sixty (60) seconds or less at least ninety percent (90%) of the time. [REDACTED]

☐ The communications system shall enable remote reprogramming of all endpoints to change all programmable information in the device, such as the number and frequency of data elements reported. COMPLY

☐ The communications system shall enable remote firmware upgrades to all electric endpoints without a field visit. COMPLY

☐ Time stamp of readings and actual endpoint reading time shall be within one minute of the system reference time (e.g., National Institute of Standards and Technology). COMPLY

☐ All system hardware must be capable of reporting diagnostic, tamper alerts and errors to the data collection system. COMPLY

☐ The system shall support advanced metering functions such as demand, time-of-use (TOU), load profiling and multi-channel capability (e.g., KVA, KVARH). COMPLY

3.3 AMI Communication Requirements

☐ The AMI solution shall support either a single- or multi-layer infrastructure (i.e., local-area network (LAN) and wide-area network (WAN)). COMPLY

☐ The LAN must utilize two-way communication from the endpoint device to the collector for all electric devices. COMPLY – FlexNet RF

☐ The WAN must support multiple communications technologies from the collector device to the central host server (e.g., wired or wireless: TCP/IP-based, GPRS, CDMA, Ethernet, BPL or Wi-Fi). COMPLY

☐ The AMI solution must support the following two-way communication methods:

- Scheduled data messages (programmable for daily, hourly, sub-hourly);
COMPLY

- Proactive messages (unsolicited messages sent as events occur);
COMPLY

- On-demand messages (in near real-time); and
COMPLY

- Broadcast messages (also providing control functions).
██████████

☐ The AMI solution shall be designed so that increases in data requirements (e.g., moving from daily reads of all customers to hourly reads of all customers) do not raise the operation and maintenance cost of the system. ██████████

PUD 3 will provide communications via TCP/IP protocol from collectors to the host server(s). Bidders shall provide an estimate of the total number of collectors (and repeaters, if applicable) required for reading a specific set of meters. In the event of communication loss from endpoint to collector or collector to host server, there must be no loss of data or endpoint information. ██████████

3.4 IT Security Requirements

The proposed system must protect confidentiality using advanced encryption techniques as follows:

- ☐ The system must support Advanced Encryption Standard (AES) 256-bit or higher encryption at the head-end and at the meter level. [REDACTED]
- ☐ The system must utilize, at a minimum, SSL 128-bit encryption when transporting data over the Wide Area Network (WAN), with preference given to systems utilizing 256-bit or higher encryption. [REDACTED]

The proposed system must utilize advanced techniques to ensure authentication and integrity of data as follows:

- ☐ Role-Based Access Controls (RBAC) within the head-end enabling the utility to restrict operational and data access on a granular basis to both individuals and systems with an explicit need.
- ☐ Native and Lightweight directory access protocol (LDAP) head-end user authentication mechanisms. The native authentication mechanism is based on User ID and hashed passwords.
- ☐ Downstream digital signatures applied to utility configurable message classes.
- ☐ Hash-based Message Authentication Codes (HMACs).
- ☐ Cyclic Redundancy Checks (CRC's) at the radio packet level to detect transmission errors and poorly implemented packet deception attacks.
- ☐ Using Public Key Infrastructure (PKI) and various asymmetric digital signature mechanisms, the head-end and interconnected systems must collect, validate and store non-reputable message acknowledgements.
- ☐ Mobile administration software must make use of digital certificates issued by the head-end to authenticate field tools and support two-factor authentication.

3.5 AMI Hardware Component Requirements

3.5.1 Single and Polyphase Meters

- ☐ Proposed electric meters must be manufactured, sold and supported by a single vendor to ensure effective support. [REDACTED]

☐ Proposed electric meters must be capable of transmitting Smart Energy Profile (SEP 1.0).
COMPLY

☐ Single and polyphase electric meters proposed by the vendor must be rated to the following minimum standards: Operating temperature from -40 Degrees Celsius to +85 Degrees Celsius, nominal voltage 120V-277V auto-ranging power supply suitable for both 277V/480V, 4W, wye services and 240V/480V, 4W, delta services, operating voltage 80% to 115% of nominal voltage, frequency 57Hz to 63Hz, relative humidity of 5% to 95% non-condensing, voltage burden less than or equal to 1.9 watts maximum. [REDACTED]

☐ Meters must be field programmable via an optical port that can be utilized without removing the protective cover. [REDACTED]

☐ Meters must offer display options for +kWh, -kWh, net kWh, added kWh, time-of-use and demand. [REDACTED]

☐ Meter firmware must be remotely programmable and upgradable over the AMI network. [REDACTED]

☐ Meters must meet the following applicable ANSI Standards including C12.1, C12.10, C12.18, C12.19, and C12.20 (0.2 and 0.5 Accuracy Classes).
COMPLY

☐ Endpoints must be capable of providing the following information:

○ Daily kWh reading with time stamp;

COMPLY

○ Daily maximum kW demand with programmable intervals and time stamp;

COMPLY

○ Time-of-use billing data;

COMPLY

○ Hourly load profile data with or without the use of a load-profile-enabled meter;

COMPLY

○ Tamper detection, reverse energy flow detection and endpoint health diagnostics;

COMPLY

○ The number of momentary outages and events; and

COMPLY

- Duration of sustained outages in minutes.

COMPLY

- Bidders should describe additional information available from the endpoints.

Gen 4 | More & Better Data

- Bidders shall supply existing and future compatibility specifications for meters.

- Endpoints must be certified to comply with FCC Part 15 rules.

COMPLY

- Single-phase residential electric endpoints must be preprogrammed for standard single-phase residential meters and require no programming prior to installation.

COMPLY

- Single-phase residential electric endpoints shall allow interrogation and reprogramming over the AMI system without interruption of the service connection.

COMPLY

- Single-phase residential electric endpoints shall synchronize to a single host time source and shall not exceed a one-minute time drift.

COMPLY

☐ Data displayed on the single-phase residential electric meter must match the reading provided by the AMI system.

COMPLY

☐ Single-phase residential electric endpoints shall have a programmable outage and restoration notification time. This shall be reprogrammable from the host system.

COMPLY

☐ Single-phase residential electric endpoints shall have data storage capability to store over thirty (30) days of hourly load profile data. This data shall not be lost during power outages.

COMPLY

3.5.2 Polyphase Meters (C&I)

- ☐ Proposed polyphase electric meters must be manufactured, sold and supported by a single vendor to ensure effective support.

- Polyphase electric meters proposed by the vendor must be rated to the following minimum standards: Operating temperature from -40 Degrees Celsius to +85 degrees Celsius, nominal voltage 120V-277V auto-ranging power supply suitable for both 277V/480V, 4W, wye services and 240V/480V, 4W, delta services, operating voltage 60% to 115% of nominal voltage, frequency 57Hz to 63Hz, relative humidity of 5% to 95% non-condensing, voltage burden less than or equal to 2.5 watts maximum.

15 JANUARY 2005

- ☐ Meters must be field programmable via an optical port that can be utilized without removing the protective cover.

██████████

- ☐ Meters must offer display options for +kWh, -kWh, net kWh, added kWh, time-of-use and demand.

██████████

- Meter firmware must be remotely programmable and upgradable over the AMI network.

- ☐ Polyphase electric meters must provide up to fifteen (15) channel load profile data.

██████████

- Polyphase meters must meet the following applicable ANSI Standards including C12.1, C12.10, C12.18, C12.19, and C12.20 (0.2 and 0.5 Accuracy Classes).

Journal Pre-proof

- Endpoints must be capable of providing the following information:

- Daily kWh, kVARh, kVAh readings with time stamp;

██████████

- Daily maximum kW demand with programmable intervals and time stamp;

██████████

- Time-of-use billing data for multiple channels;

██████████

- Hourly load profile data for multiple channels;

██████████

☐ Access to all meter diagnostics registers (i.e., tamper detection, reverse energy flow detection, health diagnostics, site diagnostics, power quality diagnostics);
[REDACTED]

☐ Number of momentary outages and events; and
[REDACTED]

☐ Duration of sustained outages in minutes.
[REDACTED]

☐ Bidders should describe additional information available from the endpoints.

☐ Bidders shall supply existing and future compatibility specifications for polyphase meters.

☐ Endpoints must be certified to comply with FCC Part 15 rules.
[REDACTED]

☐ Polyphase electric endpoints shall be preprogrammed for standard polyphase meters and require no programming prior to installation.
[REDACTED]

☐ Polyphase electric endpoints shall allow interrogation and reprogramming over the AMI system without interruption of the service connection. [REDACTED]
[REDACTED]

☐ Polyphase electric endpoints shall synchronize to a single host time source and shall not exceed a one-minute time drift.
[REDACTED]

☐ Data displayed on the polyphase electric meter must match the reading provided by the AMI system.
[REDACTED]
[REDACTED]

☐ Polyphase electric endpoints shall have a programmable outage and restoration notification time. This shall be reprogrammable from the host system.
[REDACTED]

☐ Polyphase electric endpoints shall have data storage capability to store over thirty (30) days of five (5)-minute load profile data. This data shall not be lost during power outages.
[REDACTED]

3.5.3 AMI Network Infrastructure Devices

☐ Any network device placed in the field must meet the following minimum requirements:

☐ Utilize a 120/277 (+10% / -20%) VAC power input;
COMPLY

- Utilize an outdoor NEMA enclosure, rated for -40° C to +70° C, with remote antenna capability, that can be pole- or wall-mounted;
COMPLY

- Allow remote firmware upgrades; and
COMPLY

- Utilize Advanced Encryption Standard (AES) using unique keys at the endpoint to protect home or premise information from interception. To ensure data security, this encryption must utilize 256-bit encrypted communication methods.
[REDACTED]

- ☐ The system's data collectors shall have, at a minimum, eight (8) hours of battery backup and remain fully operational during that time. No data loss shall occur if the life of the battery is exceeded.
COMPLY

- ☐ The AMI system shall not rely on any collector device as a single point of failure for data retrieval of any specific endpoint's data.
[REDACTED]
[REDACTED]

3.6 Host Server

Host server shall:

- ☐ Be capable of control and monitoring functions for multiple AMI technologies to provide future feature flexibility. [REDACTED]

- ☐ Provide a dashboard of system health with instant indication of Endpoint Status, Collector Alerts, Endpoint Alerts, Deployment Status, Validation Threshold Alerts, E-mail Alerts and Not Logging Alerts.
[REDACTED]

- ☐ Have defined APIs and MultiSpeak® most recent version compliant interfaces to allow for existing and planned software application interfaces.
[REDACTED]

- ☐ Have flexible billing extracts which interface to a reasonable selection of existing industry standard billing applications including HTE Naviline.
[REDACTED]

- ☐ Provide possible energy theft detection and reporting.
[REDACTED]

- ☐ Offer customized reports.
COMPLY

☐ Support online viewing of reports and extraction to common formats such as Microsoft Excel or Adobe PDF.

COMPLY

☐ Provide audit reporting capabilities.

COMPLY

☐ Provide methods of user authentication.

COMPLY

☐ Provide support for flexible data extract formats.

COMPLY

☐ Provide mapping capabilities for display of detected outages.

COMPLY

☐ Support for a web browser-based interface.

COMPLY

☐ Operate using Microsoft Windows Server 2012 R2 or later and SQL Server 2012 or later.

COMPLY

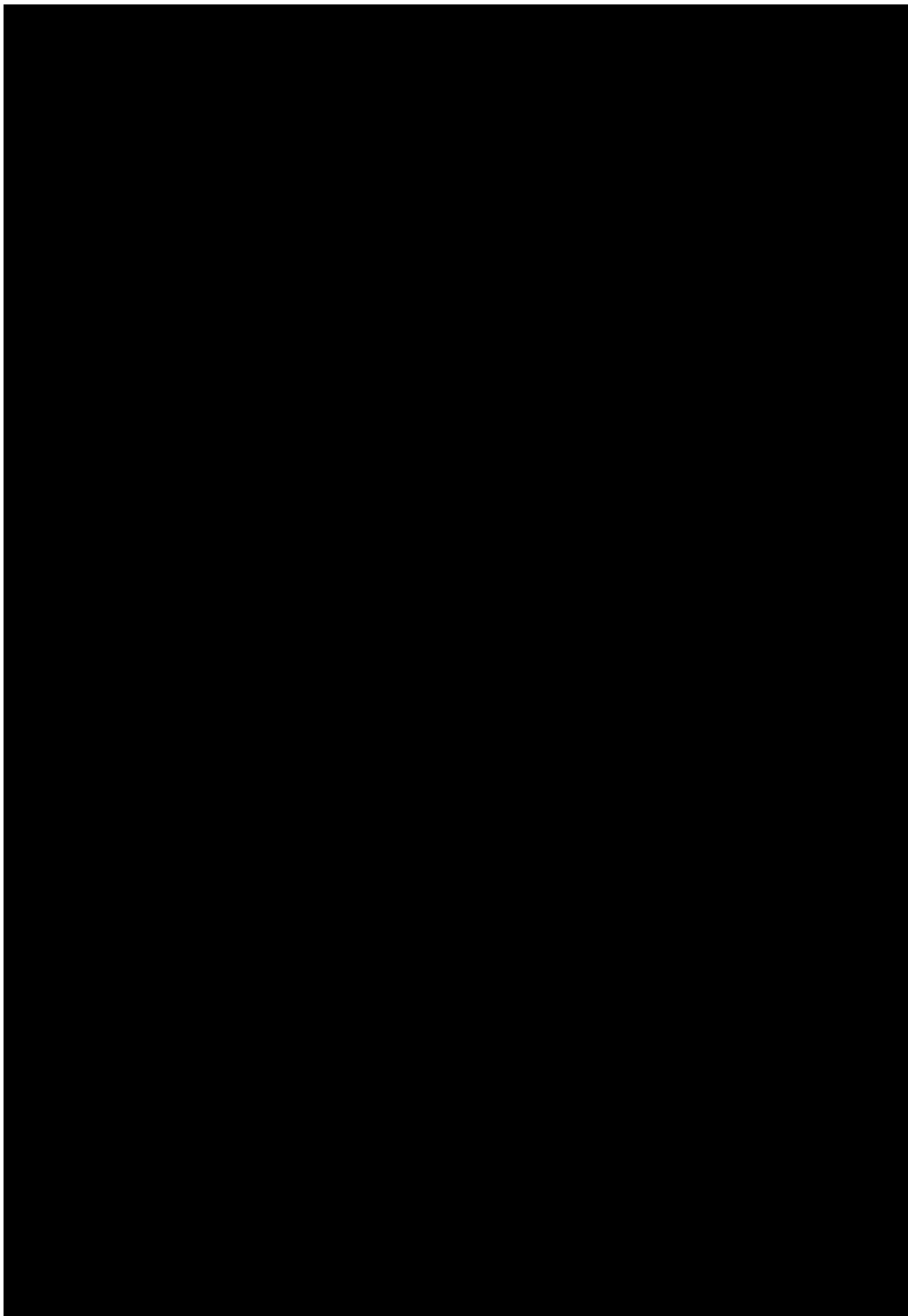
Bidder shall provide an estimate of the capacity/bandwidth required between the host server and the collectors.

128k

Bidder shall provide an estimate for storage of the monthly and yearly run rates based on fifteen (15) minute, hourly and daily intervals.

About a Gig a month per site depending on loading for 1 hour interval collection. This is the push data, under normal conditions. Polling data and outages increase this.

Bidder shall provide screenshots of host server dashboard and key reports available from the proposed system.



Bidder shall provide details of the system's MDM capabilities, if available.

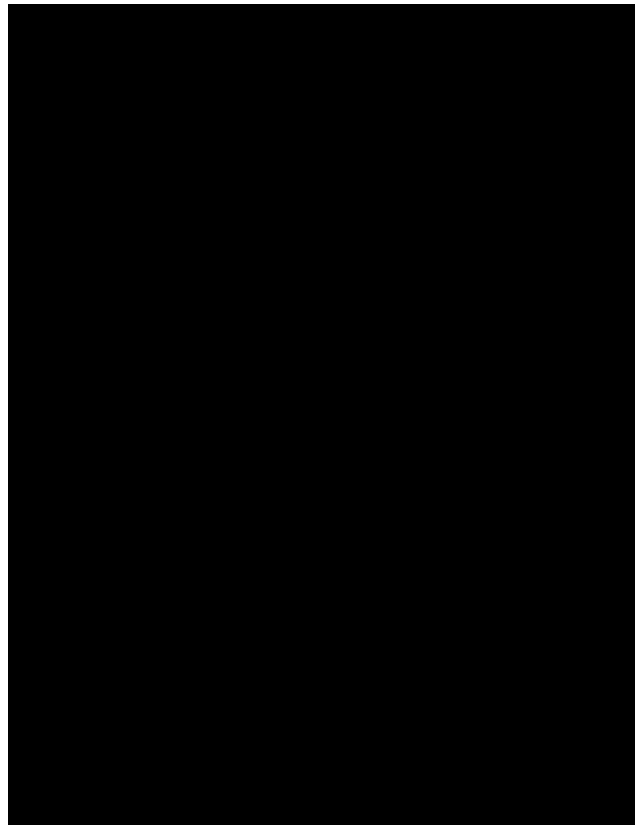


Bidder shall offer and describe available IT hosting services, including disaster recovery and data backup capabilities provided at the hosting site, as well as how the software can be hosted by the PUD and support costs.



Bidder shall provide minimum server hardware requirements.

1.1 RNI40



3.7 Advanced System Requirements

3.7.1 Outage Detection

☐ The system endpoints shall be configurable to provide unsolicited power outage alerts in the event of power loss within thirty (30) seconds or less.



☐ All communication modules installed in electric meters must provide a “last gasp” packet of data in the event of a power outage to ensure rapid and accurate response to the outage condition.



☐ Power outage and power restoration notifications for electric devices shall be detected and reported to the central host server with an average response time of less than fifteen (15) minutes.



- ☐ Offer the capability to alert PUD 3 employees via e-mail and text message.

- ☐ Provide notification thresholds which are configurable in the host server software system.

3.7.2 Remote Disconnect/Reconnect

- ☐ The remote disconnect/reconnect device must be an internal switch under the meter cover.

- ☐ The device must be capable of operating safely at meter nameplate amperage and must be rated for a minimum of ten thousand (10,000) operations.

- ☐ The system must provide verification of the device's status after operation.

- ☐ The system must provide an option to operate the internal switch as a service limiter based on a programmable load threshold.

- ☐ The device must fit standard residential meters with no modifications or connections.

- ☐ The remote disconnect/reconnect device must have provisions to prohibit reconnection of service if an alternate source of power is present.

3.7.3 Advanced AMI System Applications

The bidder shall define how the AMI system supports or will support the following advanced system applications:

- ☐ The AMI solution shall allow future support of remote distribution automation function (i.e., capacitor bank control) without physical change-out of field-installed devices.

- ☐ DA Collectors (Access or Takeout Points) shall provide backhaul connection via Ethernet connections.

- ☐ The AMI network infrastructure shall be capable of supporting DA/SCADA applications utilizing the following industry standard communication protocols: DNP 3.0, PGE 2179, ABB, Modbus, CHK/Gridsense, Syprotect, Utilinet, S4, PSI and ASCII. Sensus used Automation Control as its SCADA Data collection and can provide to other scada if interested.

☐ The AMI solution shall allow future support of load control devices (i.e., relays) without physical change-out of field-installed devices.

☐ The AMI solution shall allow future support of prepayment applications without physical change-out of field-installed devices at locations where switchable meters have been installed.

☐ The AMI solution shall allow for network and available software support for a future voltage management solution for energy conservation and stable supply across the PUD 3 distribution grid including but not limited to following features:

○ Implement, track, and sustain continuous improvement of a utility's distribution power delivery to its customers;

○ Reduce the energy usage for utilities, without a change in how customers use energy;

○ Analyze each circuit and locate potential service delivery issues proactively; and

○ Validate energy reduction using rigorous statistical methods.

3.8 System Training Requirements

The bidder must identify standard training procedures for all required PUD 3 personnel. The proposal must include training costs, number of days required for onsite training and complete list of training topics and personnel required to attend.

3.9 AMI System Implementation Requirements

Bidder shall describe its account management approach, including the turnover process from presale through post-implementation support.

For this project, bidder shall be responsible for supplying, delivering, training and ensuring the proposed AMI system is operational prior to full deployment. This shall include, but not be limited to:

☐ AMI system deployment management and support;
NRTC Project Manager will work with MCPUD3 PM

☐ Network deployment planning and installation training;
NRTC RF Engineer will implement and turn up basestations and be available for continual support as quoted.

- ☐ Host system controller configuration and installation;

Sensus will implement the head end system and administrative training will be provided by NRTC PM

- ☐ Support for the development of an interface and integration with the utility billing system, the Outage Management System and other enterprise applications;

[REDACTED]

- ☐ Establishing with the utility and supporting initial functional testing of the system; and NRTC Project Management

- ☐ Utility and subcontractor support for complete field network and meter installation;

Section 4. Additional System Requirements

Mason County PUD No. 3 desires that the network solution which offers remote monitoring and control functions to electric meters on the District's system also provides the capability to support additional features and functions including but not limited to:

- ☐ Grid / Distribution Automation

- Voltage regulator monitoring and control.

[REDACTED]

- Distribution feeder capacitor bank monitoring and control.

[REDACTED]

- Network protector relay monitoring and control.

[REDACTED]

- Faulted circuit indicator monitoring.

[REDACTED]

- Intelligent Feeder Voltage management.

[REDACTED]

- ☐ Dynamic Load Control.

[REDACTED]

- ☐ Dynamic Voltage Management.

[REDACTED]

- ☐ Grid Management Functions.

Need Definition

- Distributed Generation Monitoring & Control Functions.

[REDACTED]

4.1 General Requirements

The bidder shall provide detailed information on the following requirements that demonstrate that the bidder's solution can provide additional features and functions other than the core AMI requirements:

- ☐ The two-way, fixed RF Mesh network communications system shall provide peer-to-peer or true node-to-node support. Data will not need to be sent to an additional node(s) if the two nodes that need to exchange data can communicate.

[REDACTED]

- The bidder shall provide details on field deployed sites that use this feature. PUD 3 is looking for details on the actual number of customers and nodes using the application. COMPLY – references provided

☐ The solution shall have multiple radio enclosure options to allow for integration with multiple products. The bidder shall provide details on integration with current and future third-party products.

██████████

☐ The solution shall have polling and unsolicited report by exception messaging.

██████████

☐ The solution shall provide an option for localized intelligence at the end-device level. The bidder shall provide details on how the solution provides this intelligence and what features and functions it can support, such as:

○ Localized polling and unsolicited reporting.

██████████

○ Localized monitoring.

██████████

○ Protocol Conversions to allow for backward compatibility.

██████████

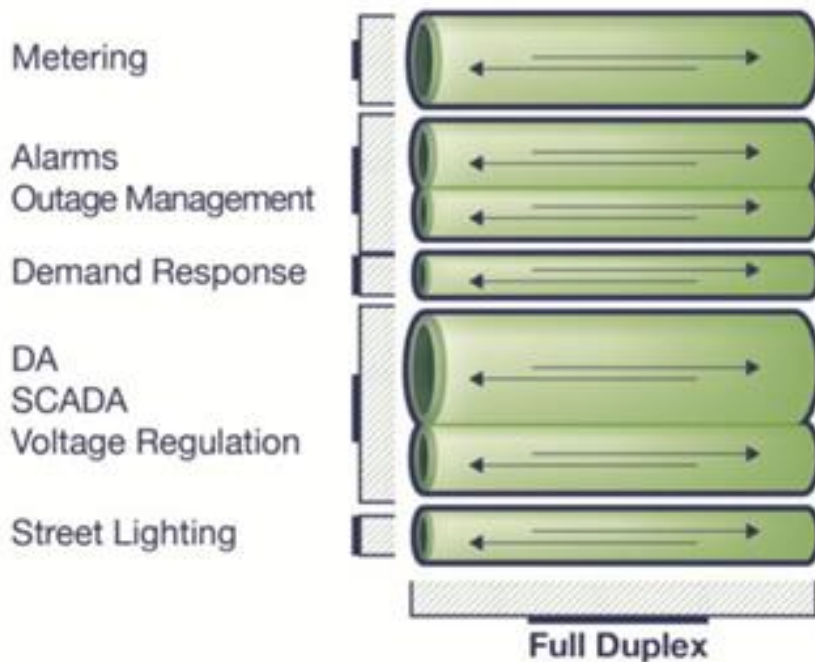
○ Over-the-Air programming to allow for updates to applets or firmware.

██████████

□ The solution shall have a prioritization scheme to allow high value messages to flow through the network faster. The scheme shall be message-based and not product-based to allow for multiple message types out of a single device.

FlexNet

Multiple Prioritized Channels



4.2 Grid / Distribution Automation Requirements

□ The bidder must provide details on existing projects with other utilities that have used the proposed solution for applications such as:

- Voltage regulator monitoring and control.
- Distribution feeder capacitor bank monitoring and control.
- Network protector relay monitoring and control.
- Faulted circuit indicator monitoring.
- Intelligent feeder voltage management.

□ The bidder shall demonstrate a history of working with third parties and its DA equipment to provide value to utilities. The bidder shall provide a complete list of third-party vendors

and the products they have integrated with. PUD 3 is also looking for the number for units deployed in the field in actual working systems versus lab or demonstration projects.

☐ The solution must work or demonstrate its ability to integrate with existing DA SCADA head-end applications.

4.3 Dynamic Load Control Requirements

Bidder should describe how its offering can support Dynamic Load Control capabilities over the proposed network at the same time as AMI functions.

[REDACTED]

4.4 Dynamic Voltage Management Requirements

Bidder should describe how its offering can support Dynamic Voltage Management capabilities over the AMI network at the same time as AMI functions.

[REDACTED]

4.5 Grid Management Functional Requirements

Bidder should describe how its offering can support Grid Management functions over the proposed network containing details of features and functions that include, but are not limited to Distributed Generation Monitoring & Control Functions.

[REDACTED]

Section 5. Product Warranties

The bidder shall provide detailed warranty information with its proposal, including warranties for all hardware, software, etc. A complete description of all warranty coverage shall be included in the proposal. The warranty information shall encompass the following:

☐ Electric endpoints: no less than three (3) years from date of installation.

Standard warranty on all iConA meters is extended by NRTC to [REDACTED] from ship date. C&I metering is [REDACTED] – extension can be purchased

☐ Collectors and repeaters: no less than two (2) years from date of installation.

One year standard from ship date – extension can be purchased

☐ The bidder must guarantee the Federal Communications Commission (FCC) radio frequencies and radio network utilized with bidder's product will be available to Mason County PUD No. 3 for use in its AMI system for a minimum of fifteen (15) years. If the frequencies or radio network utilized by the bidder is no longer available or functional for use in the AMI system for any reason during the fifteen (15) year warranty period, bidder shall modify, repair or replace the system with an equivalent functioning system at bidder's sole and exclusive expense.

[REDACTED]



Company Overview

**National Rural Telecommunications Cooperative
2121 Cooperative Way
Herndon, VA 20171
Phone 703 787 0874**

Key Contacts

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

**Chad Dose
AMI Sales Engineer – Utility Solutions
Phone 703 464 5356
CDOSE@NRTC.COOP**

NRTC has partnered with AMI technologies for over ten years, and has been partnered with Sensus, for about four years. In this time NRTC now has [REDACTED] member cooperatives with the Sensus FlexNet System, and continues to present to more. Sensus has over 16 million smart points deployed, and was almost a billion dollar company in 2013.

NRTC feels that Sensus' FlexNet is the right fit for our member cooperatives of the technology available today. The licensed spectrum provides FCC protection of the radio frequency, and is the most powerful transceiver available in the market.

NRTC was established in 1986 and continues to bring technology to rural America.



*NRTC Response to
Mason County PUD 3 - AMI RFP – References*

References

Name	Deployment Size	Address	Contact Info
Cobb EMC	195,000 Electric	Cobb EMC 1000 EMC Parkway Marietta, GA 30060	[REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED]
Jackson EMC	208,000 Electric	P.O. Box 38 850 Commerce Road Jefferson, GA 30549	[REDACTED] [REDACTED] [REDACTED]
San Bernard Electric Cooperative, Inc	23,000 Electric	P.O. Box 1208 Bellville, TX 77418	[REDACTED] [REDACTED] [REDACTED] [REDACTED]
Sawnee EMC		543 Atlanta Hwy Cumming, GA 30040	[REDACTED] [REDACTED] [REDACTED]
Talquin Electric	51,000 Electric	1640 West Jefferson St Quincy, Florida 32353	[REDACTED] [REDACTED] [REDACTED]
Wake EMC	38,000 electric	228 Park Ave Youngsville NC 27596	[REDACTED] [REDACTED] [REDACTED]
NRECA	[REDACTED] did the implementation of the San Bernard Electric Sensus System before moving to NRECA	NRECA	[REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED]
Freeborn-Mower Coop Services	6,000 Electric deployed	2501 Main Street East. Albert Lea, MN.	[REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED]



2121 Cooperative Way
Herndon, VA 20171
(703) 787-0874

Quote

Page 1 of 3

Date
Quote #

1/27/2015
846

NRTC AMI Solutions Quotation

Member #: 300518
Quote prepared by: Dose, Chad
Quote valid until: 2/26/2015

Bill To

Mason County PUD 3
PO BOX 2148
Shelton WA 98584

Ship To

Mason County PUD 3
2621 E Johns Prairie Rd.
Shelton WA 985584

Please circle if Tax Exempt: Yes No
If yes, please furnish Sales Exemption Form

Shipping Contact: Nancy Bolender
Shipping Contact #: (360) 427-5206

Line	Part #	Item Description	Qty	Mbr. Price	Ext. Price	Description9	Display Name
1		AMI SYSTEM HARDWARE/SOFTWARE					
2							
3	TBD						
4	TBD						
5	TBD						
6	TBD						
7	TBD						
8	TBD						
9	TBD						
10	Subtotal						
11							
12							
13	TBD						
14	TBD						
15	TBD						
16	Subtotal						
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							



Quote

Page 2 of 3

Date 1/27/2015
Quote # 846

Line	Part #	Item Description	Qty	Mbr. Price	Ext. Price	Description9	Display Name
28							
29							
30							
31	TBD						
32	Subtotal						
33							
34							
35	TBD						
36							
37	Subtotal						
38							
39							
40			9				
41			9				
42	TBD		5				
43			1				
44			1				
45			1				
46	TBD		1				
47	TBD		0				
48							
49	TBD		1				
50	TBD		9				
51	TBD		0				
52	TBD		0				
53	TBD		0				
54							
55							
56	TBD		9				
57	TBD		9				



Quote

Page 3 of 3

Date 1/27/2015
Quote # 846

Line	Part #	Item Description	Qty	Mbr. Price	Ext. Price	Description9	Display Name
58							
59		Pricing Notes:					
60							
61							
62							

Subtotal
Shipping Cost (Ground)
Total



Please make PO Payable to: NRTC - PO Box 1506 - Merrifield, VA 22116-1506

Member Signature _____

Print Name & Title: _____

PO#: _____ Date: _____



2121 Cooperative Way
Herndon, VA 20171
(703) 787-0874

Quote

[REDACTED]

Date
Quote #

1/27/2015
844

NRTC AMI Solutions Quotation

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Quote prepared by: Dose, Chad
Quote valid until: 2/26/2015

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Shipping Contact #: (360) 427-5206

Line	Part #	Item Description	Qty	Mbr. Price	Ext. Price	Description9	Display Name
1		[REDACTED]					
2	TBD	[REDACTED]	1	[REDACTED]	[REDACTED]		
3	TBD	[REDACTED]	1	[REDACTED]	[REDACTED]		
4		[REDACTED]					
5	TBD	[REDACTED]	1	[REDACTED]	[REDACTED]		
6		[REDACTED]					
7	TBD	[REDACTED]	1	[REDACTED]	[REDACTED]		
8		[REDACTED]					
9	TBD	[REDACTED]	1	[REDACTED]	[REDACTED]		
10		[REDACTED]					
11	TBD	[REDACTED]	1	[REDACTED]	[REDACTED]		
12		[REDACTED]					



2121 Cooperative Way
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(703) 787-0874

Quote

Page 1 of 2

Date
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1/27/2015
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2	TBD						
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13	TBD						
14							
15	TBD						
16							
17	TBD						
18							

**NRTC TERMS AND CONDITIONS OF SALE
(LARGE PRINT VERSION AVAILABLE UPON REQUEST)**

1. General. The terms and conditions contained herein constitute the complete agreement between NRTC and Purchaser regarding this sales transaction (the "Agreement") and supersede any and all prior communications concerning this specific transaction. No course of prior dealings and no usage of the trade shall be relevant to supplement or explain any terms used in this Agreement. This Agreement is in addition to any relevant NRTC/Member Agreement, and in the event of conflicting provisions, the more restrictive provision shall govern, as determined by NRTC.

Acceptance by NRTC of Purchaser's order is expressly limited to and conditioned upon Purchaser's acceptance of the terms and conditions contained herein, which may not be changed or waived unless signed in writing by a duly authorized representative of NRTC at its home office in Herndon, Virginia. Any additional, inconsistent or different terms and conditions stated by Purchaser or contained in Purchaser's purchase order or other documents supplied by Purchaser are hereby expressly objected to and rejected.

2. Orders. All orders are received subject to acceptance by a duly authorized representative of NRTC at its home office in Herndon, Virginia. Typographical and clerical errors in quotations, orders, and acknowledgments are subject to correction by either party if made within fifteen (15) days from the date of the making thereof.

3. Payment Terms. Unless specified to the contrary in writing by NRTC's CFO or CEO, payment terms are net thirty (30) days from the date of the invoice. If payments are not made when due, Purchaser shall pay, in addition to the overdue payment, a late charge equal to the lesser of one and one-half percent (1½%) per month or the highest applicable rate allowed by law on all such overdue amounts. Purchaser shall bear all costs of collection incurred by NRTC for overdue amounts, including attorneys fees.

Unless otherwise specified, all payments of invoices shall be in United States dollars and should be remitted to NRTC by mail at the address indicated on the invoice or by electronic funds transfer to the account and according to the routing on the invoice. Receipt of payment will be determined by the date the payment is received at NRTC's remittance address or when electronic funds have been received in our designated account. If Purchaser delays delivery, date of readiness for delivery shall be the date of delivery for payment purposes.

4. Prices. Prices are subject to adjustment to NRTC's prices in effect at the time of shipment. All prices shall be in United States dollars, unless otherwise specified. Unless otherwise specified, prices do not include sales, use, services excise or other taxes of any kind, and Purchaser agrees to pay such taxes upon NRTC's request or to provide NRTC with tax exemption certificate(s) applicable to the taxable transaction(s). Unless specified to the contrary in Section 5, prepaid freight and installation costs (where applicable) will be in addition to the purchase price. Where price expressly includes transportation or other shipping charges, any increase in transportation rates or other shipping charges from date of quotation or purchase order shall be paid by Purchaser.

5. Shipment. Unless otherwise specified herein, all orders are delivered F.O.B. point of shipment, with the method of transport and route to be selected by NRTC. Where scheduled delivery is delayed due to causes specified in Section 6 below, NRTC may deliver such product(s) by moving it to storage for the account of and at the risk of Purchaser. NRTC reserves the right to deliver in installments. Any special handling costs and costs of insurance shall be paid by Purchaser. Notwithstanding any agreement with respect to delivery terms or payment of transportation charges, risk of loss or damage shall pass to Purchaser and delivery shall be deemed to be complete upon delivery of the product(s) by NRTC to a private or common carrier or upon moving into storage, whichever occurs first, at the point of shipment.

6. Delivery Dates. NRTC endeavors to make shipments of orders as scheduled; however all shipment dates are approximate, and NRTC reserves the right to readjust shipment schedules. If NRTC suffers delay in performance or delivery due to any cause beyond its control, including acts of nature, acts or omissions of Purchaser, acts of government, fires, floods, strikes or other labor disturbances, war, riot, sabotage or delays in obtaining from others suitable services, materials, components, equipment or transportation, the time of performance or delivery shall be extended for a period of time equal to the period of the delay and its consequences. NRTC will give to Purchaser notice in writing within a reasonable time after NRTC becomes aware of any such delay.

7. Order Cancellation. All orders subject to this Agreement are mutually understood by NRTC and Purchaser to be firm, non-cancelable purchase orders. Notwithstanding the foregoing, NRTC may, in its sole discretion allow Purchaser to cancel an order upon Purchaser's prior written notice and upon Purchaser's payment of reasonable and proper termination charges, including, but not limited to all direct and indirect costs associated with the order incurred prior to the effective date of notice of termination and all charges incurred by NRTC in respect to the termination. In addition, a fixed sum of fifteen percent (15%) of the final total selling price for cancellation of the order will be due from Purchaser to compensate NRTC for disruption in scheduling, restocking and other indirect costs.

8. Order Modifications/Changes. Purchaser-requested order changes, including those affecting the identity, scope and delivery of the product(s) must be documented in writing and approved by an officer of NRTC of the senior vice president level (or higher), and NRTC reserves the right to reject any change it deems inadvisable, inconsistent with its policies or incompatible with its capabilities. If any such change causes an increase or decrease in the cost of or the time required for performance of this order, an equitable adjustment shall be made in the order price or delivery schedule or both, and the order shall be modified in writing accordingly.

9. Claims. Purchaser's claims for lot shortages, correction of erroneous order charges or other errors must be made in writing and delivered to NRTC at its home office in Herndon, Virginia within fifteen (15) days of Purchaser's receipt of the product(s). Claims outside of this time period will be disallowed.

10. Returned Goods. If, upon formal inspection and/or testing of the product(s), Purchaser is of the opinion that the product(s) is defective or otherwise unacceptable, Purchaser shall notify NRTC in writing. Prior to making any return to NRTC, Purchaser must obtain a Return Authorization ("RA") from a duly authorized representative of NRTC. The following conditions also apply to returns: (1) all products returned to NRTC must include the RA and must be properly packed and shipped; delivery of returns without the RA or returns not properly packed and/or shipped will not be accepted; (2) all returns are subject to inspection and/or testing by NRTC as it deems appropriate. If NRTC determines that the returned product(s) appears to be in compliance with order specifications, it shall notify Purchaser; (3) all product(s) must be returned by delivery F.O.B. destination to NRTC-specified locations. Title and risk of loss on all product(s) shall remain with Purchaser until such returned product(s) is received by NRTC; (4) NRTC will allow a credit on all defective product(s) returned in accordance with this paragraph, calculated on a last invoice basis; (5) all product(s) under the warranty of Section 11 will be repaired or replaced at the original invoice price. Purchaser shall not be charged for parts and labor associated with replacement or repair. All returns are subject to the provisions of this Section and Section 9 governing claims. Any product(s), which has been modified, altered, damaged or used by Purchaser, may not be returned.

11. Limited Warranty. Unless otherwise provided in a third party warranty or licensing agreement, NRTC warrants that at the time of shipment, the product(s) shall be of marketable quality and free from

defects in material and workmanship and shall be of the kind and quality designated or specified by NRTC in writing. This warranty shall only apply to product defects reported in writing to NRTC within ninety (90) days from the latter of the date of shipment or the date of the NRTC invoice. This warranty is strictly limited and does not apply or extend to altered products(s) or damage caused by accident, the elements, abuse, misuse, temporary heat, overloading or by erosive or corrosive substances or the alien presence of contaminants in the product(s).

EXCLUSIONS FROM WARRANTY: THE FOREGOING IS IN LIEU OF ALL OTHER WARRANTIES, ORAL OR EXPRESSED OR IMPLIED, INCLUDING ALL WARRANTIES THAT EXTEND BEYOND THE DESCRIPTION OF THE PRODUCT (S). THERE ARE NO EXPRESS WARRANTIES OTHER THAN THOSE CONTAINED IN THIS SECTION 11 AND TO THE EXTENT PERMITTED BY LAW THERE ARE NO IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE. THE PROVISIONS OF THIS SECTION 11 AS TO DURATION AND LIMITATION OF LIABILITY SHALL BE THE SAME FOR BOTH IMPLIED WARRANTIES (IF ANY) AND EXPRESSED WARRANTIES.

Satisfaction of this warranty is limited to: (a) the replacement of the product(s) by NRTC; (b) repair or modification of the product(s) by NRTC; or (c) issuance of a credit for the non-conforming product(s). The foregoing are the Purchaser's exclusive remedies and the extent of NRTC's liability for breach of implied (if any) and express warranties, representations, instructions or defects from any cause in connection with the sale or use of the product(s). **IN NO EVENT WILL NRTC BE LIABLE FOR INCIDENTAL, INDIRECT OR CONSEQUENTIAL DAMAGES OF ANY KIND. NRTC'S MAXIMUM CUMULATIVE LIABILITY RELATIVE TO ALL OTHER CLAIMS AND LIABILITIES, INCLUDING THAT WITH RESPECT TO DIRECT DAMAGES AND OBLIGATIONS UNDER ANY INDEMNITY, WHETHER OR NOT INSURED, WILL NOT EXCEED THE COST OF THE PRODUCTS GIVING RISE TO THE CLAIM OR LIABILITY, REGARDLESS OF ANY ADVICE OR RECOMMENDATION THAT MAY HAVE BEEN RENDERED CONCERNING THE PURCHASE OR USE OF THE PRODUCT (S). ANY ACTION AGAINST NRTC MUST BE BROUGHT WITHIN EIGHTEEN MONTHS AFTER THE CAUSE OF ACTION ACCRUES. THESE DISCLAIMERS AND LIMITATIONS OF LIABILITY WILL APPLY REGARDLESS OF ANY OTHER CONTRARY PROVISION OF THE AGREEMENT AND REGARDLESS OF THE FORM OF ACTION WHETHER IN CONTRACT, TORT OR OTHERWISE, AND FURTHER WILL EXTEND TO THE BENEFIT OF NRTC'S VENDORS AND OTHER AUTHORIZED RESELLERS AS THIRD-PARTY BENEFICIARIES. EACH PROVISION IN THE AGREEMENT WHICH PROVIDES FOR A LIMITATION OF LIABILITY, DISCLAIMER OF WARRANTY OR CONDITION OR EXCLUSION OF DAMAGES IS SEVERABLE AND INDEPENDENT OF ANY OTHER PROVISION AND IS TO BE ENFORCED AS SUCH.**

12. Resolution of Disputes. In the event of a dispute between NRTC and Purchaser arising out of this Agreement, the parties shall meet and negotiate in good faith to attempt to resolve the dispute. In the event the dispute is not resolved within thirty (30) days of the date one party notified the other party in writing of the dispute, and if any party wishes to pursue the dispute, it shall be submitted to binding arbitration in accordance with the rules of the American Arbitration Association. In no event may arbitration be initiated more than one (1) year following the sending of written notice of the dispute. Any arbitration proceeding under this Agreement shall be conducted in the Commonwealth of Virginia in the county designated by NRTC. The arbiters shall have no authority to award any punitive or exemplary damages, or to vary or ignore the terms of this Agreement, and shall be bound by controlling law.

13. Licensed Equipment and Software. Products comprised of licensed equipment or software may be subject to additional terms and conditions set forth in separate agreements that will control to the extent necessary to resolve any conflicts with the warranty terms and conditions stated herein.

14. Intellectual Property. NRTC will defend any suit or proceeding brought against Purchaser based on a claim that the design or construction of the product(s) sold or licensed hereunder by NRTC infringe any U.S. Patent, Copyright or Mask Work Registration, provided that Purchaser promptly notifies NRTC of any such claim and resulting suit or proceeding in writing and further provided that, at NRTC's expense: (a) Purchaser gives NRTC the sole right to defend or control the defense of the suit or proceeding, including settlement, and (b) Purchaser provides all necessary information and assistance for that defense. Except for any consequential damages, NRTC will pay all costs and damages finally awarded or agreed upon by NRTC that are directly related to any such claim. In the event of a charge of infringement Seller's obligation under the Agreement will be fulfilled if Seller, at its option and expense, either: (i) procures for Purchaser the right to continue using such products; (ii) replaces the same with noninfringing products; (iii) modifies the same so as to make them noninfringing; or (iv) accepts the return of any infringing products and refunds their purchase price. Notwithstanding the foregoing, NRTC will have no liability with respect to any claim of infringement to the extent based on a configuration or modification incorporated in the products at the request of Purchaser, on any process application into which the products are integrated by Purchaser, or on use of the products in combination with other equipment or products not supplied by Seller. **THIS PARAGRAPH SETS FORTH NRTC'S ENTIRE LIABILITY WITH RESPECT TO INTELLECTUAL PROPERTY AND INFRINGEMENT OF PATENTS BY ANY PRODUCTS RELATING TO INFRINGEMENT OR INTELLECTUAL PROPERTY, EITHER EXPRESS OR IMPLIED. (INCLUDING SOFTWARE PROGRAMS, EQUIPMENT OR PRODUCTS THEREOF) OR BY THEIR OPERATION, AND IS IN LIEU OF ALL WARRANTIES OR CONDITIONS**

15. Export. Product(s) purchased for export outside of the United States or its possessions are covered by the respective trade laws or other legal conditions specific to the country or possession in question so understood and agreed to by both parties. Purchaser shall be solely responsible for any permits, licenses, waivers or other requirements necessary to permit movement of any product outside of the United States.

16. Governing Law. NRTC does not assume any responsibility for compliance with any foreign or federal, state or local laws and regulations, except as expressly set forth herein, and compliance with any laws and regulations relating to the product(s) is the sole responsibility of the Purchaser. All laws and regulations expressly incorporated herein shall be those in effect as of the date hereof. In the event of any subsequent revisions or changes thereto, NRTC assumes no responsibility for compliance therewith. Nothing contained herein shall be construed as imposing responsibility or liability upon NRTC for the obtaining of any permits, licenses or approvals from any agency or governmental entity, foreign or domestic, which may be required in connection with the supply of the product(s).

All sales and purchases of product(s) from NRTC, including terms and conditions thereof, shall be governed by the laws now prevailing in the Commonwealth of Virginia, without regard to its conflict of laws provisions.

17. Partial Invalidity. If any provision herein or portion thereof shall for any reason be held invalid or unenforceable in accordance with prevailing law, such invalidity or unenforceability shall not affect any other provisions or portions thereof, but the terms and conditions herein shall be construed as if such invalid or unenforceable provision or portion thereof had never been contained herein.